

THE PORT OF CORPUS CHRISTI'S
PROPOSED DESALINATION FACILITY

I. INTRODUCTION

Port Aransas Conservancy (PAC) appreciates the opportunity to provide information to the Environmental Protection Agency (EPA) regarding the application by the Port of Corpus Christi Authority (Port) for a wastewater discharge permit for a saltwater desalination facility on Harbor Island. Before discussing specific actions we believe EPA should take in this matter, it is important to understand how this particular application represents a dangerous combination of environmentally threatening factors: (1) an applicant with no experience and questionable credibility; (2) an extremely sensitive environmental location; and (3) a state agency with no prior experience reviewing this type of discharge and which has acknowledged its own limitations in time, resources, and experience with this type of discharge. Given these considerations, this matter clearly warrants close oversight and involvement by EPA.

1. The Applicant Lacks Experience and Has Questionable Credibility

The Port has never operated a desalination facility. Its lack of expertise was shown in the initial hearing in this case, when two administrative law judges found that the Port had failed, on six of nine referred issues, to meet the applicable standards for issuance of the permit.

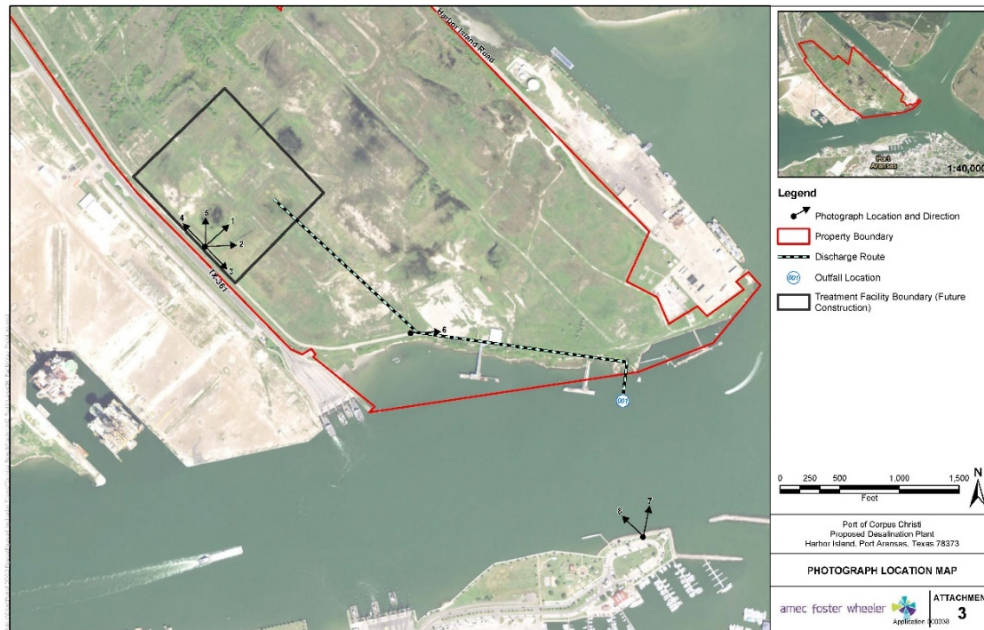
Moreover, the Port has routinely “spoken out of both sides of its mouth” in regard to this proposed facility, taking positions that are completely contradictory:

- The Port has not been forthright about whether it, or someone else, will operate the proposed facility. In legal filings in this case, the Port has stated that it “presently intends to be the owner and operator of the facility.”¹ Yet, around the same time, the Port’s Board Chairman stated in a public meeting that “. . . we’ve said consistently on both of these permits that we are not going to own, operate, or build a desalination plant.”² The Port’s CEO and other employees have made similar statements that the Port does not intend to own or operate the desalination facility, yet in legal filings the Port continues to assert it will own and operate the facility.
- The Port has consistently misrepresented the area of the discharge, initially denying the existence of an eddy at the location, then acknowledging the existence of an eddy and in fact using it as a basis for requesting that TCEQ allow it to present additional evidence regarding the eddy, and now denying there is an eddy at the location.
- In concurrently pending permitting matters, the Port has supported issuance of a permit for a marine terminal port in the exact same location as the proposed desalination facility, without making any effort to reconcile the two different permit applications. The maps below show the two proposed facilities (desalination plant and port terminal):

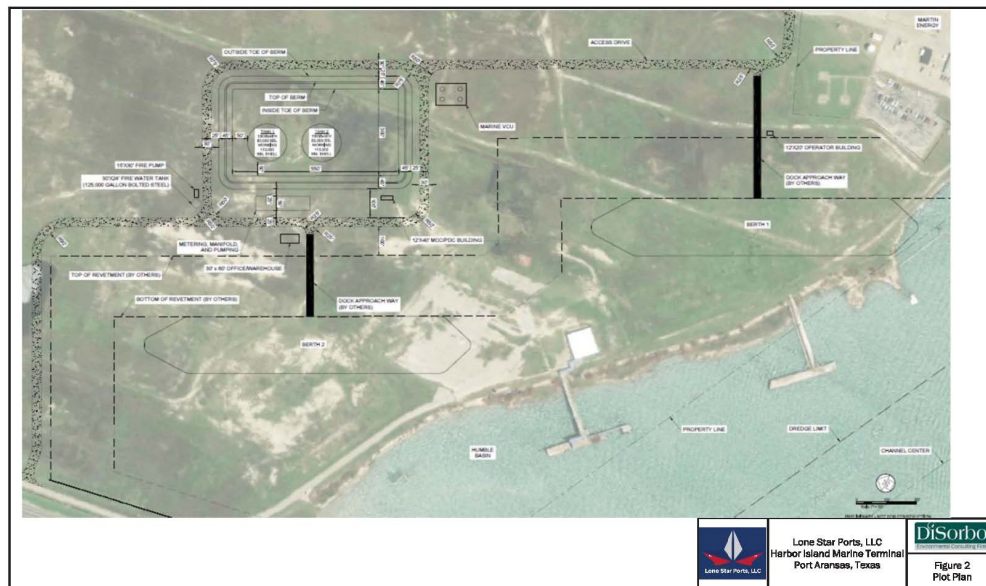
¹ Port’s Closing Arguments, at 34, in SOAH Docket 582-20-1895.

² Exhibit PAC-24, at p. 4 of 5, in SOAH Docket 582-20-1895.

The Location of the Proposed Desalination Plant



Location of Proposed Marine Terminal Facilities



APP-00930

The TCEQ approved the marine terminal facility this year using the map above. Yet now it is reviewing the desalination facility permit for the exact same location. The two facilities are mutually exclusive as currently mapped, with the proposed desalination facilities overlapping with proposed terminal facilities in a manner that is not feasible for both to co-exist. These are just a few examples of the routinely contradictory information the Port presents to permitting agencies.

2. The Location of the Proposed Discharge is Exceptionally Sensitive

The desalination facility is proposed for Harbor Island, which sits inside the environmentally sensitive Redfish Bay State Scientific Area. The Port proposes to discharge directly into one of the three channel arms of Aransas Pass, which is an area the Texas Parks and Wildlife Department (TPWD) and Texas General Land Office (GLO) have indicated is **not** an appropriate place for a discharge. In just the last month, the TPWD's designated representative, James Tolan, PhD, and an expert on larval movement, testified that the discharge location is not appropriate given its environmental significance. He also testified that TPWD had expressed many concerns to the TCEQ regarding this permit in two sets of comments on the Port's application, and these concerns were not properly addressed by TCEQ in response.

The Aransas Pass Tidal Inlet has been designated "Essential Fish Habitat," protected by the Magnuson-Stevens Fishery Conservation and Management Act. The discharge location is within the Coastal Bend Bays and Estuaries Program, which is a National Estuary Protection (NEP) area. As Dr. Greg Stunz testified, **"If I had to choose the absolute worst location on the Texas coast, from an ecological perspective, to place a desalination plant, I would choose Harbor Island in the Aransas Pass inlet."** Dr. Andrew Esbaugh, a professor at University of Texas Marine Science Institute and a physiologist and toxicologist, concluded that "[s]imply put, the area where the Port seeks to discharge effluent is one of the worst places that could have been chosen on the Texas coast for such an activity . . . [with] the potential to have devastating and far-reaching consequences to the marine environment and aquatic life, both in the immediate area and beyond."

3. The TCEQ Lacks Experience and has Performed an Inadequate Regulatory Review

This is the first application for a discharge permit for a large seawater desalination facility in EPA Region 6. The Texas review process requires much less information in the application and a much less comprehensive review of the impacts than required in California or Florida. TCEQ staff have admitted they lack experience with this type of permit, and they have displayed error after error in the regulatory review process. For example, TCEQ staff indicated the discharge is not into a NEP area, even though it clearly is. Likewise, in 2019, TCEQ staff was ready to issue a draft permit based on its modeling analysis that greatly overestimated the dilution of the Port's hyper saline effluent. PAC pointed out a significant error, and TCEQ then simply changed the draft permit to fit its new modeling results, increasing the limit on the percentage of effluent at the zone of initial dilution (ZID) from 1.95% to 18.4%. It did this with no evaluation of the impact of the resulting increase in salinity on marine species or degradation of water quality. Now, with the Port's newly revised diffuser design, the staff is proposing 14.6% at the ZID boundary, but to do so it has to allow a decrease in dilution from 1.34% to 8.9% at the aquatic life mixing zone, allowing more than a five-fold increase in the gradient of salinity to which sensitive marine species will be exposed. Again, this was done with no evaluation of such an increase in the salinity gradient.

TCEQ aquatic biologist Dr. Mimi Wallace conducted the anti-degradation review on the original application. When asked about her review, Dr. Wallace testified she was "very uncomfortable" doing the anti-degradation review on this application and further stated:

"sometimes you can have hard data and actually run some spreadsheet numbers or models and -- and really look at it from an empirical point of view. But for the most part, an antideg review on a new facility is a feeling, and my feeling with its location in this dynamic environment that it was going to be okay, that this amount of hypersaline water being discharged from this facility would not degrade the environment beyond de minimis."³

³ Ex. PAC-16, at page 62, in SOAH Docket 582-20-1895.

On multiple different occasions she indicated that her anti-degradation review was based on “feelings,”⁴ that her review was like “trying to look into a gazing ball,”⁵ that she did not have enough time to conduct her review,⁶ that she does not have an opinion on the range of salinity that would support attainable estuarine dependent aquatic life uses,⁷ that she did not know how the 90 foot hole beneath the diffuser would impact her analysis,⁸ that while she thought about it and speculated quite a lot,⁹ ultimately, she was unconcerned about possible death in the ZID.¹⁰ When asked whether the discharge from this facility would kill aquatic life, she responded simply with “I hope [not].”¹¹ Not surprisingly, the judges found the anti-degradation review insufficient. On remand, the TCEQ has offered a different aquatic biologist, Mr. Peter Schaefer, to opine on antidegradation. The thoroughness of his review is not yet clear, but it is worrisome that he was Dr. Wallace’s immediate supervisor and reviewed and approved her earlier inadequate review.

In fact, TCEQ has not even followed its own rules regarding the anti-degradation review. Specifically, 30 Tex. Admin. Code § 307.4(g)(3) states that “Salinity gradients in estuaries must be maintained to support attainable estuarine dependent aquatic life uses. Numerical salinity criteria for Texas estuaries have not been established because of the high natural variability of salinity in estuarine systems, and because long-term studies by state agencies to assess estuarine salinities are still ongoing. **Absence of numerical criteria must not preclude evaluations and regulatory actions based on estuarine salinity, and careful consideration must be given to all activities that may detrimentally affect salinity gradients.**” Despite this language, TCEQ has used the lack of numerical criteria for salinity as a basis for not conducting any meaningful review of the potential impact of salinity. Essentially, the TCEQ has simply acted as if salinity is not significant, despite extensive testimony from marine biology experts to the contrary.

It is in this context that PAC requests that EPA use its oversight authority to speak into this permitting matter and ensure that a thorough review is conducted and all applicable guidelines are followed.

II. THE “ASK”

Under Sec. IV(C)(3)(b and e) of its Memorandum of Agreement with TCEQ (June 2020), EPA may review and make specific objections in writing to the draft permit for the Port’s desalination discharge. If an objection is made, EPA is to identify the actions TCEQ must take to satisfy the objection, including identifying any effluent limitations the permit would include if issued by EPA. **In light of this authority by EPA, PAC requests that EPA object to issuance of the Port’s TPDES permit for each of the following reasons:**

⁴ Ex. PAC-16 at 34, 62:14-19, and the Transcript, Vol. 5, at 199:18-25, in SOAH Docket No. 582-20-1895.

⁵ Ex. PAC-16 at 30, 58:3-10, and the Transcript, Vol. 5, 184:14-18, 186:16-21, in SOAH Docket No. 582-20-1895.

⁶ Ex. PAC-16 at 31-32, 59:16-60:9, and the Transcript, Vol. 5, 157:2-10, 157:22-158:16, 185:1-186:10, in SOAH Docket No. 582-20-1895.

⁷ Transcript, Vol. 5, 162:15-23, in SOAH Docket No. 582-20-1895.

⁸ Ex. PAC-16 at 29, 57:1-18, and the Transcript, Vol. 5, 175:6-25, in SOAH Docket No. 582-20-1895.

⁹ Transcript, Vol 5, 182:5-11, in SOAH Docket No. 582-20-1895.

¹⁰ Transcript, Vol. 5, 166:22-167:8, in SOAH Docket No. 582-20-1895.

¹¹ Transcript, Vol. 5, at 165:21-166:2, in SOAH Docket No. 582-20-1895.

1) Inadequate Antidegradation Review:

- a) The Whole Effluent Toxicity (“WET”) testing followed by the Port to demonstrate that both Tier 1 and Tier 2 antidegradation standards will be met did not comply with appropriate WET testing principles; most specifically, neither of the species utilized in the test—mysid shrimp (*Mysidopsis bahia*) and inland silverside (*Menidia beryllina*)—nor their life stages tested are sufficiently sensitive to salinity and to changes in salinity to serve as surrogates for species such as larval Red Drum (*Sciaenops ocellatus*), for which the receiving water body is habitat; additionally, the Port’s WET testing did not address the impacts on the tested species of the combination of salinity and (i) other chemicals that are in intake waters and are concentrated in the effluent or (ii) other chemicals added to the effluent stream during the desalination process or during maintenance of the desalination plant;
- b) the Port has not demonstrated the absence of degradation to the fishable/swimmable receiving waters, yet it also has not made the demonstration required by 30 TAC § 307.5(b)(2) that degradation is necessary for important economic or social development; one of these is required (i.e., either a proper showing of no degradation or, alternatively, the legal showing necessary to allow degradation), yet neither has been shown; and
- c) the Port’s permit application and the information submitted by the Port to TCEQ and to EPA indicate the Tier 1 and Tier 2 antidegradation reviews are based primarily on the results of CORMIX modeling; yet numerous experts, including TPWD’s coastal science expert, have testified that modeling is unreliable for a discharge at this particular site, which is the site of an eddy and a deep hole.

- 2) Inattention to salinity gradients: Texas has acknowledged since at least 1981¹² that “the maintenance of proper salinity gradients during various periods of the year within estuarine waters is very important to the continuation of balanced and desirable populations of estuarine dependent marine life.” Despite this, the careful consideration required by § 307.4(g)(3) of the WQS has not been given to the possible detrimental effects of the Port’s discharge on salinity gradients. Texas has not followed its own rule in this regard.
- 3) Failure to provide intake structure safeguards: The draft permit for the facility should, but does not, include limitations to ensure that the intakes for the facility will utilize the best technology available to minimize adverse environmental impacts. Such is especially important given that (i) the Port’s facility will intake roughly 150 million gallons of water/day, (ii) the facility is a point source of discharge that has been widely acknowledged by the Port as intended to provide desalinated water to, perhaps among others, industrial consumers, and (iii) industrial consumers on and near Corpus Christi Bay use water predominately for process cooling purposes;¹³
- 4) Absence of technology-based effluent limitations and any rationale for the BPJ decision: The draft permit contains no technology-based effluent limitations, and the documentation of the best professional judgment analysis, if any, supporting the decision to forego technology-based effluent limitations provides no explanation of the analysis that was actually performed; the application and the other information submitted by the Port to TCEQ and EPA does not identify the actual expected contaminants to be borne within the discharge, nor does it identify whether the best available controls to limit those contaminants will be utilized; and

¹² 6 Tex. Reg. 1118 (March 31, 1981).

¹³ 40 CFR Part 125.81, *et seq.*, incorporated by reference at 30 TAC § 308.91, *See, e.g.*, the Carlsbad Desalination Project discharge permit, NPDES No. CA0109223, Conditions IV.C.

- 5) Absence of enforceable effluent limitations: EPA should object to the draft permit for the Port's desalination discharge, because the draft permit is not enforceable as a practical matter in several important respects; specifically, (i) the permit sets no limits on the size of the salinity gradient that may occur at or beyond the boundary of any of the zones or on the cumulative salinity concentration, i.e., discharge and background, that may occur at or beyond the boundary of any zone and (ii) the permit requires no receiving-water monitoring to determine if application representations and CORMIX modeling results regarding effluent behavior and concentrations in the receiving water are being attained.

EPA should then identify the following required actions that TCEQ must take to satisfy the objections EPA has made:

- 1(a): TCEQ should undertake or require the Port to undertake WET testing with appropriate surrogates and end points in consideration of the species, life stages, and environmental conditions at the discharge location. These tests should determine the sensitivities of these species to salinity gradients of varying magnitudes and of varying total salinity levels. The range of tests should also address the impacts on these species of the combination of salinity and (i) other chemicals that are in intake waters and are concentrated in the effluent and (ii) other chemicals added to the effluent stream during the desalination process or during maintenance of the desalination plant.
- 1(b) Since no showing has been made that the discharge will not result in degradation, unless the Port demonstrates that degradation is necessary for important economic and social development, the permit should not be issued.
- 1(c): TCEQ should not base its antidegradation review on the results of CORMIX modeling for this proposed outfall location, as the model cannot provide reliable predictions of the actual mixing at this site. Instead, TCEQ should base its antidegradation review on the best professional judgments of recognized marine biology experts, such as those at TPWD and GLO and the independent university experts that PAC brought to the permitting process.
- 2: TCEQ should require the Port to demonstrate it has given the careful consideration to the possible detrimental effects of its discharge on salinity gradients.
- 3: TCEQ should require the Port to demonstrate that less than 25% of the intake volume for its facility will be used for industrial process cooling purposes. If that demonstration is made, the draft permit should be amended to make that condition a term of the permit. If that demonstration is not made, then TCEQ should require the Port to complete a §316(b) analysis, and the draft permit should be amended to require safeguards that are consistent with that analysis.
- 4: TCEQ must require identification of all potential contaminants in the discharge, including chemicals added as a result of maintenance and operation of the facility, and technology-based effluent limitations for all constituents present, including salinity, copper and total dissolved solids (TDS), should be developed using best professional judgment with a full explanation of the basis for the limitations or decisions to not include limitations.
- 5: If any draft permit is issued, TCEQ must require the Port to comply with appropriate permit limits on the increase in salinity at the mixing zone or other appropriate location as recommended by TPWD. The draft permit should also require periodic monitoring of the receiving water to determine compliance with such a limit on changes in salinity in the permit or other monitoring to determine the reliability of reliance on the CORMIX model. The inability of the CORMIX model to provide reliable predictions of mixing for this particular site justifies such model validation or proof of compliance with the protections needed for marine species and water quality.

**Attachments Supporting the Presentation to EPA by the Port Aransas Conservancy¹
On the Port of Corpus Christi Authority's Discharge Permit for its
Proposed Harbor Island Desalination Facility**

**For Meeting with EPA
December 8, 2021**

Tab

1. Recommendations of the Texas Parks and Wildlife Department and the Texas General Land Office
2. Quotes from Proposal for Decision Issued by the Administrative Law Judges Following the Hearing on the Merits on the Port's Application
3. Quotes from the Testimony of Experts of the Port Aransas Conservancy in the Hearing on the Port's Original Application for a Discharge Permit for its Proposed Desalination Facility
4. The Port's Outfall Location is not Appropriate for Evaluation with the CORMIX Model
5. Results from the CORMIX Model Show Dangerous Levels of Salinity throughout the Mixing Zones
6. Permit Enforcement Issues
7. Admissions from the Port on its Speculation in the Permit
8. The Port's Failure to Characterize the Eddy

¹ <https://portaransasconservancy.com/> The Conservancy is not anti-desalination and could support the Port's plans if the discharge were properly designed and placed offshore, as the Port has agreed to do for its intake.

**RECOMMENDATIONS OF THE TEXAS PARKS & WILDLIFE DEPARTMENT AND
THE TEXAS GENERAL LAND OFFICE**

In 2018, the two agencies charged with protection of coastal resources issued their “Report on Marine Seawater Desalination Diversion & Discharge Zone Study.”² In it, these agencies highlighted the importance of protecting passes, such as Aransas Pass, due to the important role the passes play.

Because marine organisms have complex life cycles and habitat requirements, this study highlights the importance of passes connecting Texas estuaries with the Gulf of Mexico. . . . Many aquatic species including Gulf Menhaden, flounder, redfish, shrimp, blue crab, and green sea turtles utilize major and minor coastal passes to reach habitats or food sources required during their various life stages. . . . Protection of water chemistry within passes is important since water quality and salinity levels within bays and estuaries directly influence marine life and the habitats upon which they depend for food and shelter.

The agencies also made a number of recommendations³ including:

At a minimum, [TCEQ’s] evaluations should address:

- the potential for depressed oxygen levels due to poorly dispersed brine discharges at a particular location;
- the contaminants discharged with the brine that resulted from natural sources (such as fluoride and copper) and from chemicals used in the operation and maintenance of the desalination facility such as conditioning reagents, antiscalant chemicals, and metals from corrosion of piping (iron, chromium, and nickel); and
- a site-specific analysis is recommended to determine if there is toxicity and, if so, the steps needed to minimize the impact.

and

Key recommendations from published literature concerning discharge plume regulations and modeling approaches, and these include:

- limiting salinity increases at the mixing zone boundary⁴ to no more than 5% (or an absolute increment of 2 practical salinity units (psu), whichever is less) of that occurring naturally in the waters around the discharge;
- accounting for effluent density and flow rates on plume behavior; and
- applying conservative assumptions when evaluating dilution and overall flushing of the discharge site to ensure the dilution requirement at the edge of the mixing zone is still met . . .

TPWD also submitted its comments to EPA on the Port’s application for the discharge permit at issue here. Those 2018 comments included the exact same sets of recommendation and a copy of the comments follows this summary.

TCEQ ignored all of these recommendations and others in the 2018 report and TPWD comments.

James Tolan, the TPWD staff in Corpus Christi and expert in larvae of fish and shellfish along the Texas Gulf Coast, testified in this case that the agency’s comments were not properly characterized nor properly addressed by TCEQ in its response to comments.⁵

² <https://tpwd.texas.gov/publications/pwdpubs/media/hb2031dz.pdf>

³ Id at page 5.

⁴ The agencies recommend a conservative mixing zone boundary of 100 meters from the discharge, which is not the distance used by TCEQ, but the recommendation of an appropriate limit still applies

⁵ Deposition testimony of James Tolan, PhD.

Comments of the Texas Parks and Wildlife Department of August 24, 2018, on the Application of the Port of Corpus Christi Authority for TPDES Permit WQ0005253000



August 24, 2018

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Office of the Chief Clerk, MC-105
Texas Commission on Environmental Quality
PO Box 13087
Austin, TX 78711-3087

Re: TCEQ Industrial Wastewater Discharge NORI for Permit Number WQ0005253000

Dear Sir or Madam:

The Texas Parks and Wildlife Department (TPWD) appreciates the opportunity to provide comment on the application for the proposed Texas Pollutant Discharge Elimination System (TPDES) industrial wastewater discharge permit for Port of Corpus Christi Authority (POCCA) of Nueces County. (Permit No. WQ0005253000). TPWD is the agency with primary responsibility for protecting the state's fish and wildlife resources (Texas Parks and Wildlife Code §12.0011(a)) in addition to encouraging outdoor recreation on Texas water resources. With respect to this role, we are concerned about water quality for fish and wildlife. Additionally, we are charged with providing information on fish and wildlife resources to any local, state, and federal agencies or private organizations that make decisions affecting those resources (Texas Parks and Wildlife Code §12.0011(b)(3)). Please be aware that a written response to a TPWD recommendation for informational comment received by a state government agency may be required by state law. For further guidance, please see Texas Parks & Wildlife Code Section 12.0011.

In light of the statutory mandate, we have reviewed the aforementioned TPDES permit application and offer our comments.

TPWD has several concerns regarding POCCA's application to discharge 95,600,000 gallons of treated desalination brine concentrate to the Corpus Christi Channel at Harbor Island. Estuaries are among the most productive natural systems and are important nursery areas that provide specific salinities to complete development phases, refuge from predation, and are sources of food for many species (Patillo et al. 1997). The location of the proposed discharge is within an estuarine area TPWD designated in 2000 as the Redfish Bay State Scientific Area (RBSSA). The RBSSA contains a unique and fragile environment including seagrass beds, oyster reefs, marshes and mangroves, providing a feeding and nursery habitat for shrimp, crabs, and gamefish, waterfowl, shorebirds and turtles. Many aquatic species including Gulf Menhaden, flounder, redfish, shrimp, blue crab, and green sea turtles utilize major and minor coastal passes such as the Corpus Christi and Aransas Channels to reach habitats or food sources required during their various life stages (Nelson 1992, Patillo et al. 1997, Renaud et al. 1995).

Furthermore, there is a rather large, and well-known annual aggregation of mature sheepshead very close to the proposed discharge location every winter. This area is also an important spawning aggregation area. TPWD is concerned that any increased water temperatures, especially in the winter months, could pose a problem for the spawning habitat in this area by the release of warm water from the desalination plant discharge. Depending on the spatial extent of any potential water temperature increase from this discharge, this fishery, used by fishing guides and recreational anglers, might be impacted.

In conducting a technical review of this permit application for the discharge of brine concentrate waste, TPWD recommends the following evaluations. The first three are important to aquatic organisms because a shift in the salt ratio and type of salt can cause osmotic imbalance and toxicity. At a minimum, evaluations should address:

- the total salt content as compared with receiving waters;
- the source of the salts (in the case of mixed or comingled waste discharges);
- the ratio of the type of salts compared with those in the receiving waters;
- whether there is adequate circulation to prevent the salt from building up over time to a point where it is toxic to the ecological community;
- the potential for depressed oxygen levels due to poorly dispersed brine discharges at a particular location;
- the contaminants discharged with the brine that resulted from natural sources (such as fluoride and copper), and from chemicals used in the operation and maintenance of the desalination facility such as conditioning reagents, antiscalant chemicals, and metals from corrosion of piping (iron, chromium, and nickel); and
- a site-specific analysis is recommended to determine if there is toxicity and, if so, the steps needed to minimize the impact.

Key recommendations from published literature (Roberts et al. 2012) concerning discharge plume regulations and modeling approaches include:

- using a mixing zone approach to regulate discharges;
- regulating toxicity and water quality objectives at the edge of a mixing zone boundary that is conservatively recommended to be 100 meters from the discharge and includes the entire water column;
- limiting salinity increases at the mixing zone boundary to no more than 5% (or an absolute increment of 2 practical salinity units (psu), whichever is less) of that occurring naturally in the waters around the discharge; and
- accounting for effluent density and flow rates on plume behavior; and applying conservative assumptions when evaluating dilution and overall flushing of the discharge site to ensure the dilution requirement at the edge of the mixing zone is still met.

TPWD is currently in consultation with the permit applicant and encourages continued discussions with TPWD Coastal Fisheries staff knowledgeable of the potential impacts

from this discharge related to temperature changes, salinity, and dissolved oxygen within this area of Harbor Island prior to finalizing the permit. TPWD encourages TCEQ staff to participate in these discussions as well as the permit application moves through a technical review.

TPWD requests that these comments be considered during the technical review of the proposed permit application. We appreciate the opportunity to offer comment and look forward to working with TCEQ, the applicant, and other stakeholders on this matter. If you have questions or need more information, please contact me at cindy.loeffler@tpwd.texas.gov or (512) 389-8715. Thank you again for the opportunity to comment and for the opportunity to work collaboratively with you and your colleagues to conserve and protect Texas' valued aquatic resources.

Sincerely,



Cindy Loeffler
Water Resources Branch Chief

CL:ms

cc: Ms. Anne Rogers Harrison
Mr. James Murphy
Mr. Alex Nunez
Mr. Brian Bartram

References:

Nelson, D.M. (editor). 1992. Distribution and abundance of fishes and invertebrates in Gulf of Mexico estuaries, Volume I: data summaries. ELMR Rep. No. 10. NOAA/NOS Strategic Environmental Assessments Division, Rockville, MD. 273 p.

Patillo, M.E., T.E. Czapla, D.M. Nelson, and M.E. Monaco. 1997. Distribution and abundance of fishes and invertebrates in Gulf of Mexico estuaries, Volume II: Species life history summaries. ELMR Rep. No. 11. NOAA/NOS Strategic Environmental Assessments Division, Silver Spring, MD. 377p.

Renaud, Maurice L., J. Carpenter, and J. Williams. 1995. Activities of juvenile green turtles, *Chelonia mydas*, at a jettied pass in South Texas. Fishery Bulletin 93(3):586-593. U.S. Department of Commerce, NMFS Scientific Publications Office. Available online: <https://www.st.nmfs.noaa.gov/spo/FishBull/933/933toc.htm>. Accessed July 2018.

Roberts, P., Jenkins, S., Paduan, J., Schlenk, D., and J. Weis. 2012. Management of Brine Discharges to Coastal Waters, Recommendations of a Science Advisory Panel. Environmental Review Panel (ERP). Southern California Coastal Water Research

Project. Costa Mesa, CA. Technical Report 694. Available online:
[ftp://ftp.sccwrp.org/pub/download/DOCUMENTS/TechnicalReports/694 BrinePanel
Report.pdf](ftp://ftp.sccwrp.org/pub/download/DOCUMENTS/TechnicalReports/694%20BrinePanel%20Report.pdf). Accessed March 2018.

Tab 2

**QUOTES FROM PROPOSAL FOR DECISION ISSUED BY THE ADMINISTRATIVE LAW JUDGES
FOLLOWING THE HEARING ON THE MERITS ON THE PORT'S APPLICATION⁶**

- The proposed discharge location is ecologically sensitive. P.62
- Aransas Pass tidal inlet is important to the life cycle of aquatic organisms for the entire ecosystem. P.62
- There is a high concentration of marine life in the Aransas Pass inlet. P.62
- The Aransas Pass tidal inlet is the most important multispecies spawning site for the most economically valuable sport fishes in the region. P.71
- Aransas Pass tidal inlet is the only connection between the Gulf of Mexico and Texas's bays and estuaries for many miles to the north and south. P.62
- Due to the inlet's key role for estuarine-dependent species in the area, the potential impacts of the discharge on aquatic life are magnified. P.62
- And the organisms that rely on the Aransas Pass tidal inlet cannot simply go elsewhere. P.62
- High salinity can be fatal to aquatic life. Particularly early life stages. P.63
- Saline imbalances can be fatal to aquatic life. Particularly early life stages. P.63
- Fish larvae and embryos are sensitive to even small changes in salinity. P.63
- Even small increases in salinity may have adverse effects, particularly if the ambient salinity is already at the physiological limit for some species. P.65
- The evidence shows that disruption of fish reproduction ultimately results in reduced populations of adult fish, and therefore, impacts fishing and fisheries. P.73
- TPWD fish stocking program - \$3.7 MM annually to stock 20 MM fish along the Texas coast. P.72
- The record establishes that the 18.4% effluent limit at the ZID boundary was not set based on what is protective of aquatic life. P.66
- The ED's CORMIX modeling, which was used to calculate the 18.4% limit, does not produce reliable predictions of the effluent concentrations at the ZID and mixing zone boundaries. P.67
- The Texas Surface Water Quality Standards also require that salinity gradients in estuaries must be maintained to support attainable estuarine-dependent aquatic life uses. But Dr. Wallace did not have an opinion on the range of salinity that would support such uses. P.41

⁶ The full PFD is available at the date February 5, 2021 at https://www14.tceq.texas.gov/epic/eCID/index.cfm?fuseaction=main.detail&item_id=755483042018190&detail=filing&StartRow=1&EndRow=1&Step=5&requesttimeout=5000.

**QUOTES FROM THE TESTIMONY OF EXPERTS OF THE PORT ARANSAS CONSERVANCY IN
THE HEARING ON THE PORT'S ORIGINAL APPLICATION FOR A DISCHARGE PERMIT FOR
ITS PROPOSED DESALINATION FACILITY**

Greg Stunz, Ph.D. (Texas A&M University-Corpus Christi, Endowed Chair for Fisheries and Ocean Health, Professor of Marine Biology, Director of Center for Sportfish Science and Conservation, Harte Research Institute for Gulf of Mexico Studies):

The proposed discharge of brine into the Aransas Pass tidal inlet is likely to have significant adverse impacts on marine life within Corpus Christi Bay, neighboring bay systems, and the Gulf of Mexico. **If I had to choose the absolute worst location on the Texas coast, from an ecological perspective, to place a desalination plant, I would choose Harbor Island in the Aransas Pass inlet.**

The Corpus Christi Bay, Aransas Pass, and the neighboring bay systems make up a marine environment unlike anywhere else in the world. This is the epicenter of Texas' fisheries and home to numerous endangered sea turtles and the majestic whooping crane. **Discharging 96 million gallons a day into the heart of this ecosystem would, in my opinion, be catastrophic.**

The fisheries in the Corpus Christi Bay, Aransas Pass tidal inlet, and the Gulf of Mexico support a multi-million dollar commercial fishing industry.... I do know that the adverse effects to fish populations that will result from the proposed brine discharge has the potential to **cause catastrophic damage both to the commercial and recreational fishing industries, ...**

Brad Erisman, Ph.D. (University of Texas Marine Science Institute (UTMSI) Professor; Director of the Coastal Fisheries Research Program at UTMSI):

From the perspective of fish ecology, ecosystem health, and fisheries, **the location chosen by the Port of Corpus Christi for the discharge is literally the worst possible location. . . .** I strongly oppose granting this permit . . . Granting the requested permit without a more stringent review **threatens the existing sensitive local and regional ecology with long-lasting and potentially irreversible harm.**

Andrew Esbaugh, Ph.D. (UTMSI Professor; specialist in impact of salinity on aquatic life):

Simply put, the area where the Port of Corpus Christi seeks to discharge effluent is one of the worst places that could have been chosen on the Texas coast for such an activity. It is an important and highly sensitive area from an ecological standpoint. If issued, the permit has the potential to have devastating and far-reaching consequences to the marine environment and aquatic life, both in the immediate area and beyond.

Scott Holt (Retired after 36 years as a Research Scientist at the University of Texas Marine Science Institute in Port Aransas,)

. . . the discharge of brine, in these volumes, into the Aransas Pass tidal inlet **will result in a significant increase in the mortality of larvae as they enter Aransas Pass on the journey to the nursery grounds in Corpus Christi Bay and surrounding estuary systems.**

Bruce Wiland (Professional Engineer; former employee of predecessor to TCEQ):

No permit should be issued. There is not sufficient information available to the agency and the public to support a permit. Moreover, the information available does not support a position that the permit would protect water quality or the environment.

**THE PORT'S OUTFALL LOCATION IS NOT APPROPRIATE
FOR EVALUATION WITH THE CORMIX MODEL**

The TPWD/GLO report, discussed above, recommends that outfalls for discharges from desalination facilities be located in the Gulf. The Port disagrees. However, it picked one of the worse locations in the Corpus Christi Ship Channel for its outfall. It then moved the outfall location to even a worse location for its amended application. See Figure 1 from the Port's application on the next page.

While TCEQ has no model to use other than the CORMIX model, even one of its modelers admits that there are locations at which the use of the model is not appropriate.⁷

The Port's current proposed location is clearly such a location.

- The jets for the diffuser discharge are proposed at an elevation of about 64 feet below mean low tide in a 95 foot hole in the Corpus Christi Ship Channel, a channel currently authorized for dredging to a depth of only 54 feet.
- The location of the diffuser, which is on the side of the 95 foot hole, is also proposed to be in a small cove, which will result in the hyper saline effluent plume running into the sides of the cove to the east and west well before it reach any boundary of the three mixing zones during most tidal conditions.
- The dense saline plume will then turn toward the center of the channel and sink into the 95 foot hole. It will not jump over the hole.
- The plume will be aided in its movement around and into the hole by the eddy that the Port claimed was well known and created the hole and which the Port now claims does not exist.
- The plume is also aided in its rotational movement by the flow in the ship channel close to the side of the hole, at and below 64 foot depth, especially as the channel waters flow around the two points of land that extend out into the channel above and below the water.
- Once the dense saline plume is in the hole it will remain there, given the constant addition of new hyper saline effluent. There is no evidence, study or basis for the Port's position that the dense plume will be washed out by tidal action.

The CORMIX User's Manual makes it clear that the model must assume:

- a flat or slightly sloping bottom, not a hole from which the dense effluent plume must climb upward and out of to be mixed;
- uniform flow, circular or significantly non-uniform flow, because of the bathymetry and shape of Harbor Island; and
- tidal conditions can return some of the effluent to the mixing zones as the tides change direction.

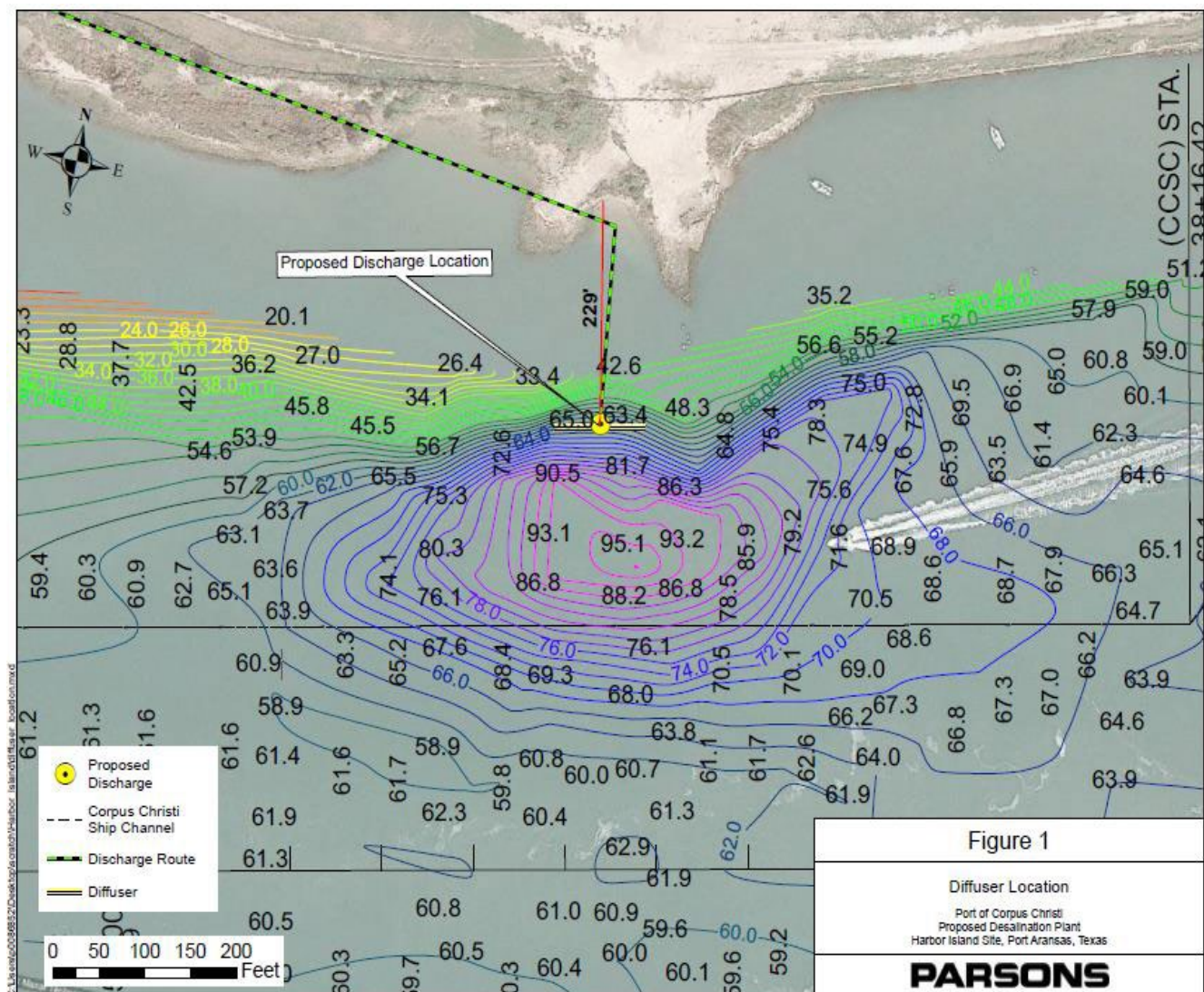
The Conservancy has hired Scott Socolofsky, PhD, of Texas A&M University, an expert in hydromechanics and environmental fluid mechanics, who worked with G.H. Jirka, PhD, the developer of the CORMIX model for EPA. He has also worked extensively with Robert Doneker, PhD who currently provides and upgrades the CORMIX model.

⁷ Deposition testimony of Michalk PAC 15, Excerpts from the deposition, page 50 lines 13 – 20. Also see page 48 line 16 - page 50 line 13,

Tab 4 Continued

Dr. Socolofsky's opinion is exactly the same as that of judges in their proposal for decision from the initial hearing, i.e. that the model does not provide reliable predictions of the mixing at the boundaries of the three mixing zones.⁸

The Port had a wide range of locations in the Gulf or in the Corpus Christi Ship Channel for its outfall. Had it selected one that meets the criteria for the use of the model, TCEQ's use of the model for predicting mixing and levels of salinity in the receiving waters would have been appropriate. It did not, and TCEQ now must rely on the experts familiar with conditions at the outfall and the marine species that spawn, migrate through or otherwise use the area of the discharge. TCEQ could have relied on experts and TPWD and GLO; it did not even reach out to those agencies for advice.



The yellow line represents the alignment a length of the line of ports for the diffuser which is also aligned along the north boundary of all three mixing zones.

⁸ The Conservancy urges EPA to contact experts on the use of the CORMIX model to obtain other opinions on its use for this outfall location.

**RESULTS FROM THE CORMIX MODEL SHOW DANGEROUS LEVELS OF SALINITY
THROUGHOUT THE MIXING ZONES**

- In its original application, the Port stated what it intended to achieve in the way of mixing performance:

. . . the modeled effluent at the boundaries of the mixing zones for the various diffuser designs achieved percentages below 2.5% at the ZID, 1.5% at the aquatic life mixing zone, and 1.0% at the human health mixing zone. The diffuser will be designed to achieve these target levels of mixing performance as determined through modeling across the range of flow rates⁹.

- Yet, as the table below shows, the corrected modeling for the initial diffuser design and that for the current proposed design do not come close to those targets.

The table below shows critical conditions for the worst case scenario from use of the CORMIX model by TCEQ. The model provides the percentage of effluent remaining at the three mixing zones for the two original and the current draft permits

<u>TCEQ Modeling Results</u>			
	For 2019	For 2020	For 2021
<u>Boundary</u>	<u>Draft Permit</u>	<u>Corrected Permit</u>	<u>Draft Permit</u>
ZID:	1.95	18.4	14.6
ALMZ	1.34	1.34	8.9
HHMZ	1.20	1.20	5.4

These percentages of effluent do not however indicate the worst case conditions for exposure of marine species to salinity levels or salinity gradients. This can be seen in the Table on the next page, where the results of the modeling by TCEQ that developed the critical conditions for the 2021 draft permit were used to determine the levels and changes of salinity under those limited conditions addressed in TCEQ's modeling.

Line 8, highlighted in red, shows the critical conditions resulting in the figures shown for the 2021 draft permit in Table 1 for TCEQ's modeling. Yet, comparing these figures and those in yellow for columns O through T shows that that TCEQ's critical conditions result in much lower salinity levels in the zones and much smaller increases in salinities in those zones than do model simulations for very similar conditions.

For example, the change in salinity for line 8 at the mixing zone is 1.13 ppt while the change shown on line 13 is 2.5 ppt, well over twice the salinity change reflected in TCEQ's worst case scenario. There are many more lines, in addition to the two in yellow that make the point. And, as line 13 shows, a change in salinity from the ambient levels of 40.57 to 43.07 occurs at times when the salinity levels in the ship channel are already putting stress on the early life stages of fish and shell fish migrating through the channel. And these results are for only a few sets of conditions out of the full range of conditions that will occur frequently in the receiving waters.

Thus, even the use of the CORMIX model predicts levels of exposure to changes in salinity in excess of those recommended by the Texas Parks and Wildlife and Texas General Land Office.

⁹ Port's Original Application page S-App 339

Tab 5 Continued

CORMIX Model Results for Salinity Increases

Case	ZID %	MZ %	HH %	Eff	Ambient	Sal Ambient	Sal Effluent	Sal ZID	Sal MZ	Sal HH	Sal Dif ZID	Sal Dif MZ	Sal Dif HH	Sal %above		
				Flowrate (MGD)	Velocity (m/s)									ZID	MZ	HH
S_40_a	14.6	8.9	5.2	95.6	0.8	29.93	46.8	32.39	31.43	30.81	2.46	1.50	0.88	8%	5%	3%
S_40_b	14.6	8.9	5.2	95.6	0.8	40.57	59.7	43.36	42.27	41.56	2.79	1.70	0.99	7%	4%	2%
S_40_c	14.6	8.9	5.3	95.6	0.8	29.93	46.8	32.39	31.43	30.82	2.46	1.50	0.89	8%	5%	3%
S_40_d	14.6	8.9	5.2	95.6	0.8	40.57	59.7	43.36	42.27	41.56	2.79	1.70	0.99	7%	4%	2%
W_40_a	14.6	8.9	5.4	95.6	0.8	23.24	35.9	25.09	24.37	23.92	1.85	1.13	0.68	8%	5%	3%
W_40_b	14.6	8.9	5.2	95.6	0.8	33.20	51.6	35.89	34.84	34.16	2.69	1.64	0.96	8%	5%	3%
W_40_c	14.6	8.9	5.4	95.6	0.8	23.24	35.9	25.09	24.37	23.92	1.85	1.13	0.68	8%	5%	3%
W_40_d	14.6	8.9	5.2	95.6	0.8	33.20	51.6	35.89	34.84	34.16	2.69	1.64	0.96	8%	5%	3%
S_50_a	14.6	8.9	5	83.1	0.8	29.93	53.9	33.43	32.06	31.13	3.50	2.13	1.20	12%	7%	4%
S_50_b	14.6	8.9	5	83.1	0.8	40.57	68.7	44.68	43.07	41.98	4.11	2.50	1.41	10%	6%	3%
S_50_c	14.6	8.9	5	83.1	0.8	29.93	53.9	33.43	32.06	31.13	3.50	2.13	1.20	12%	7%	4%
S_50_d	14.6	8.9	5	83.1	0.8	40.57	68.7	44.68	43.07	41.98	4.11	2.50	1.41	10%	6%	3%
W_50_a	14.6	8.9	5.1	83.1	0.8	23.24	41.2	25.86	24.84	24.16	2.62	1.60	0.92	11%	7%	4%
W_50_b	14.6	8.9	5	83.1	0.8	33.20	59.4	37.03	35.53	34.51	3.83	2.33	1.31	12%	7%	4%
W_50_c	14.6	8.9	5.1	83.1	0.8	23.24	41.2	25.86	24.84	24.16	2.62	1.60	0.92	11%	7%	4%
W_50_d	14.6	8.9	5	83.1	0.8	33.20	59.4	37.03	35.53	34.51	3.83	2.33	1.31	12%	7%	4%
S_50_a_95	14.6	8.9	5.1	95.6	0.8	29.93	53.9	33.43	32.06	31.15	3.50	2.13	1.22	12%	7%	4%
S_50_b_95	14.6	8.9	5.1	95.6	0.8	40.57	68.7	44.68	43.07	42.00	4.11	2.50	1.43	10%	6%	4%
S_50_c_95	14.6	8.9	5.1	95.6	0.8	29.93	53.9	33.43	32.06	31.15	3.50	2.13	1.22	12%	7%	4%
S_50_d_95	14.6	8.9	5.1	95.6	0.8	40.57	68.7	44.68	43.07	42.00	4.11	2.50	1.43	10%	6%	4%
W_50_a_95	14.6	8.9	5.1	95.6	0.8	23.24	41.2	25.86	24.84	24.16	2.62	1.60	0.92	11%	7%	4%
W_50_b_95	14.6	8.9	5.1	95.6	0.8	33.20	59.4	37.03	35.53	34.54	3.83	2.33	1.34	12%	7%	4%
W_50_c_95	14.6	8.9	5.2	95.6	0.8	23.24	41.2	25.86	24.84	24.17	2.62	1.60	0.93	11%	7%	4%
W_50_d_95	14.6	8.9	5.1	95.6	0.8	33.20	59.4	37.03	35.53	34.54	3.83	2.33	1.34	12%	7%	4%
W_40_c_strat	14.6	8.9	5.4	95.6	0.8	23.24	35.9	25.09	24.37	23.92	1.85	1.13	0.68	8%	5%	3%
S_40_c_strat	14.6	8.9	5.2	95.6	0.8	29.93	46.8	32.39	31.43	30.81	2.46	1.50	0.88	8%	5%	3%
S_40_c_strat_2	14.6	8.9	5.3	95.6	0.8	29.93	46.8	32.39	31.43	30.82	2.46	1.50	0.89	8%	5%	3%
W_40_c_05	4.6	3.3	2.6	95.6	0.05	23.24	35.9	23.82	23.66	23.57	0.58	0.42	0.33	3%	2%	1%
W_40_c_06	4.8	3.5	2.8	95.6	0.06	23.24	35.9	23.85	23.68	23.59	0.61	0.44	0.35	3%	2%	2%
W_40_c_08	12.8	6.6	4.2	95.6	0.08	23.24	35.9	24.86	24.08	23.77	1.62	0.84	0.53	7%	4%	2%
W_40_c_09	12	7	4.4	95.6	0.09	23.24	35.9	24.76	24.13	23.80	1.52	0.89	0.56	7%	4%	2%
W_40_c_1	12.3	7.4	4.6	95.6	0.1	23.24	35.9	24.80	24.18	23.82	1.56	0.94	0.58	7%	4%	3%
W_40_c_2	14.6	8.9	5.4	95.6	0.2	23.24	35.9	25.09	24.37	23.92	1.85	1.13	0.68	8%	5%	3%
W_40_c_3	14.6	8.9	5.4	95.6	0.3	23.24	35.9	25.09	24.37	23.92	1.85	1.13	0.68	8%	5%	3%
W_40_c_4	14.6	8.9	5.4	95.6	0.4	23.24	35.9	25.09	24.37	23.92	1.85	1.13	0.68	8%	5%	3%
W_40_c_5	14.6	8.9	5.4	95.6	0.5	23.24	35.9	25.09	24.37	23.92	1.85	1.13	0.68	8%	5%	3%
W_40_c_6	14.6	8.9	5.4	95.6	0.6	23.24	35.9	25.09	24.37	23.92	1.85	1.13	0.68	8%	5%	3%
W_40_c_7	14.6	8.9	5.4	95.6	0.7	23.24	35.9	25.09	24.37	23.92	1.85	1.13	0.68	8%	5%	3%
W_40_c_8	14.6	8.9	5.3	95.6	1	23.24	35.9	25.09	24.37	23.91	1.85	1.13	0.67	8%	5%	3%
W_40_c_9	14.6	8.9	5.3	95.6	1.2	23.24	35.9	25.09	24.37	23.91	1.85	1.13	0.67	8%	5%	3%
W_40_c_10	14.6	8.9	5.3	95.6	1.5	23.24	35.9	25.09	24.37	23.91	1.85	1.13	0.67	8%	5%	3%
W_40_c_11	14.6	8.9	5.3	95.6	1.7	23.24	35.9	25.09	24.37	23.91	1.85	1.13	0.67	8%	5%	3%
W_40_c_12	14.6	8.9	5.3	95.6	2	23.24	35.9	25.09	24.37	23.91	1.85	1.13	0.67	8%	5%	3%

PERMIT ENFORCEMENT ISSUES

TCEQ's draft permit does not have the enforceable limits needed to protect the water quality and the marine environment. These enforceable limits are needed to ensure that TCEQ, EPA and affected persons can bring actions for violations under the Federal Clean Water Act.

The need to ensure enforceable permits:

- One of the most important provisions of the Federal Clean Water Act allows enforcement by EPA and affected persons even when the NPDES permit program is delegated to a state. In fact, Texas provisions for public participation were from 1970s to the late 1990s a key road block to EPA's authorization of Texas to implement the federal NPDES process.
- Texas has the discretion not to enforce its permit, but not to issue permits that others cannot enforce. And here the issuance of the permit would set terrible precedent for future permits for discharges from desalination facilities in Texas, if not across large parts of the country.

The deficiencies in the permit:

There are two major deficiencies:

- i. The lack of any limits to assure salinity levels and changes in salinity levels in the receiving water do not violate water quality standards or significantly affect marine species.
- ii. The failure to require monitoring in the receiving water given the unreliability of the CORMIX model **for this particular outfall location.**

i. Lack of salinity limits:

The dispute here is based in large part on the position of TPWD and GLO that limits on salinity levels are needed. Their report and the comments of TPWD on this Port application included a recommendation that:

salinity increases at the mixing zone boundary to no more than 5% (or an absolute increment of 2 practical salinity units (psu), whichever is less) of that occurring naturally in the waters around the discharge;

Whether those figures are the right ones here is not the issue. There are no limits on the levels of salinity and salinity gradients to which marine species will be exposed.

As discussed above, a limit on the percentage of effluent predicted by the CORMIX model cannot be a valid surrogate for limits on high salinity exposures. The two are not the same or even correlated.

Other Requirement 4 in the draft permit requires the permittee to "maintain the diffuser at Outfall 001 to achieve a maximum dilution of 14.6 percent effluent at the edge of the zone of initial dilution (ZID)." That is from TCEQ's critical condition as determined by its modeling, but it does not set any limit on the one constituent in the proposed discharge that is known to be toxic to fish at elevated levels.

And the mixing in the ZID is not a proper location to set a limit on mixing. Good mixing could occur in the ZID but essentially end there or well before the effluent makes it through the other mixing

Tab 6 Continued

zones. TCEQ has provided no explanation why the ZID should be the sole location for any such standard.

In fact, the results of TCEQ's own CORMIX modeling here show the problem. In the first hearing when TCEQ's draft permit set 18.4% of the effluent remaining at the ZID, the model was showing about 1.34% at the aquatic life mixing zone boundary a very significant amount of mixing in that mixing zone. Yet, TCEQ's modeling for the revised diffuser now predicts a small percentage (14.6%) at the ZID but much more effluent (8.9%) left at the aquatic life mixing zone. That increase from 1.34% of the effluent to 8.9% at the boundary of the mixing zone means more than a five-fold increase in the salinity gradient at the aquatic life mixing zone for the new diffuser.

Thus, if the permit is issued, the Port could change in the diffuser design, operations or even location of the outfall, there would need to be no additional mixing in that aquatic life or the human health mixing zones as long as the model predicted not more than 14.6% of the effluent remaining at the ZID boundary.

ii. Lack of monitoring in the receiving water.

There is no evidence that the CORMIX model has ever been validated for the type of conditions that exist at the proposed location of the outfall. As discussed above, the CORMIX User's Manual makes it clear that many of the conditions at the site conflict significantly with the required assumptions for using the model. Because TCEQ has no other model, has no expertise in the impacts of high salinity levels or gradients on marine species, and because of its refusal to rely upon its sister agencies for that expertise, TCEQ continues to insist on reliance on the CORMIX Model.

If it is allowed to do so, it clearly needs to include monitoring in the receiving waters to determine if the model predicts the mixing that actually occurs. The permit for the Carlsbad desalination facility in California provides one example of how such monitoring could be done.

There is also no monitoring to determine the extent of the salinity pool in the bottom of the hole. Again, there are simple monitoring devices that can be placed in the hole to determine the levels of salinity and provide data needed to evaluate the risk to the marine environment and water quality from such pooling or stratification.

ADMISSIONS FROM THE PORT ON ITS SPECULATION IN THE PERMIT

A KRIS TV article from March 14, 2019, reported a Port official saying with regard to the Harbor Island facility:

While the City [of Corpus Christi] is not interested in building a desal plant here, that does not mean someone else won't be.

And

The Port isn't looking to build a desalination plant, but to merely hand over a permit package to an interested person.

Sarah Garza, Director of Environmental Compliance and Planning for the Port, is quoted in the piece as saying:

There is a possibility that a third party will come out and still want to put in a desal plant and go through the permitting process.

The Corpus Christi Caller Times, on July 20, 2018, in an article titled "Tide of Opposition forms to Port of Corpus Christi's Desalination Plans" reported that:

Port leaders have been adamant that the port has no intention of building or operating a desalination facility, but is trying to get the lengthy permit process out of the way in the event the City of Corpus Christi, county, or some other third party opts to construct one itself.

At a TCEQ public meeting on the Ports discharge permit on April 8, 2019, Sarah Garza stated that the Port had no intension of building, owning or operating the facility.

On September 15, 2020, the chair of the Port Commission said almost the same thing.

I think we've said consistently on both of these permits that we are not going to own, operate, or build a desalination plant. We are in the process of trying to get the permits in order to meet one of the concerns that our industry partners had several years ago about having an uninterruptable source of water.¹⁰

¹⁰ See the attached PAC Exhibit from the initial hearing.

THE PORT'S FAILURE TO CHARACTERIZE THE EDDY

Legal requirements:

30 TAC §305.48 (a). . . (3) The applicant shall submit any other information reasonably required by the executive director to ascertain whether the facility will be constructed and operated in compliance with all pertinent state and federal statutes. . . .

The Port's Commitment to TCEQ to Obtain the Remand for a Second Bite

1. May 19, 2021 meeting of the Commissioners of TCEQ:

COMMISSIONER JANECKA: . . . has your client looked into, and, and given an explanation – . . . what's the answer for why there was a discrepancy between the depth of the bottom at the discharge point of the outfall, of, of 60, approximately 60 feet, versus 90 feet?

MR. WOTRING: Because there was a localized eddy that changes the, the [bathymetry] at that exact location. . . . That's the type of data that we think we can provide that will show that being deeper, and having more current enhances the mixing, . . .

. . . for issues like the [bathymetry], and the tidal ambient velocity, and the eddy flow – it was our view that . . . the localized factors made the existing modeling more conservative . . . But, . . . the ALJs disagreed with that. That's the kind of things we, we can provide.

The Port's Position on the Eddy.

- May 2019 -There is an eddy generated hole in the ship channel:

The reason that the CORMIX models were run at 63 feet is because that is the depth of the channel in that area. The Corpus Christi Ship Channel is dredged and maintained at 47 feet. However, in that area, there is a natural eddy as a result of the Ship Channel, the Aransas Channel, and the Lydia Ann Channel confluence and that area is naturally deeper.¹¹ . . . I have attached a survey drawing which depicts the depths of the channel in this area.¹²

- September 2020 – The eddy is well known.

Q. So the question is: How did you -- what is the basis for your position there is an eddy other than the fact that there's a depression in that location?

A. It's commonly referred to.

Q. . . . By whom? The public, press, the Corps, you?

A. The Port and people who are familiar with the Port.

Q. I'm trying to get any kind of information . . . on the size, location, strength, frequency, so forth of this eddy. Do you have any of that information or know where I can get it?

A. No, sir, I do not.¹³

¹¹ Email from Sarah Garza to Katie Cunningham of May 24, 2019 in response to TCEQ's request for clarification. (PAC Exh. 23 in the prior hearing.)

¹² The survey is the Port's bathymetry (PAC Exh. 3 BW 4 in the prior hearing)

¹³ Testimony of Sarah Garza as Corporate Representative for Port on September 2, 2020, (PAC Exh 18, Excerpts from the deposition at page 33 of 44 line 4 – page 35 line 25 of 44.)

- November 2020 – Testimony of one of the Port’s modeling experts.

Q. . . . There has been testimony by other witnesses as well that within the area of this grid cell where the outfall is located, there is an eddy, correct?

A. I believe that's true, yes. . . .

Q. If there is an eddy, it takes whatever's in the water, swirls it around and around in a circle, correct?

A. Not necessarily a circle, but, yes, it swirls it around and around.

Q. It could be an oblong?

A. It could be a lot of different shapes, yes.

Q. The point being whatever is in that eddy gets caught in that eddy for some period of duration?

A. Yes.¹⁴

- May 2021 – The Port continues to tell the Commissioners there is an eddy.

See, for example, the discussion above with Commissioner Janecka.

- June 2021 - There is an eddy generated hole in the channel.¹⁵

The Port's Amended Application says this.

- July 2021 – There is no evidence of an eddy.

Port’s position based on its ADCP data collection in the area of the diffuser

- November 2021 – There is no eddy.

Testimony Lial Tischler PhD for the Port.¹⁶

Clear evidence of an eddy or series of eddies over the hole.

- Dr. Scott Socolofsky has not only seen the eddies on a site visit, he has identified them on satellite images, such as that below. The eddies show the upwelling of sediments resulting in dark areas in the eddies.
- Looking more closely than the Port did, the Port’s ADCP data shows circulation of the water in the channel from conditions such as an eddy.

¹⁴ Testimony Dr. Jordan Furnans, (Transcript from the Hearing. Vol 3, page 158 line 16 – page 159 line 19

¹⁵ Updated Application at pdf page 26.

¹⁶ Deposition Testimony of Dr. Lial Tischler, November 18, 2021.

